Advanced Research Projects Agency • ENERGY

GENI PROJECT

MICHIGAN STATE UNIVERSITY

POWER FLOW CONTROLLER FOR RENEWABLES

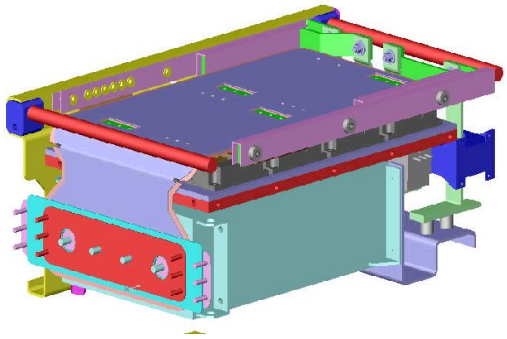
PROJECT TITLE:	Transformer-less Unified Power Flow Controller for Wind and Solar Power Transmission		
ORGANIZATION:	Michigan State University (MSU)	LOCATION:	East Lansing, MI
PROGRAM:	GENI	ARPA-E AWARD:	$2,400,000
TECH TOPIC:	Electricity Transmission & Distribution	PROJECT TERM:	2/8/12 – 2/7/15
WEBSITE:	www.arpa-e.energy.gov/ProgramsProjects/GENI.aspx		

CRITICAL NEED

The U.S. electric grid is outdated and inefficient. There is a critical need to modernize the way electricity is delivered from suppliers to consumers. Modernizing the grid's hardware and software could help reduce peak power demand, increase the use of renewable energy, save consumers money on their power bills, and reduce total energy consumption—among many other notable benefits.

PROJECT INNOVATION + ADVANTAGES

MSU is developing a power flow controller to improve the routing of electricity from renewable sources through existing power lines. The fast, innovative, and lightweight circuitry that MSU is incorporating into its controller will eliminate the need for a separate heavy and expensive transformer, as well as the construction of new transmission lines. MSU's controller is better suited to control power flows from distributed and intermittent wind and solar power systems than traditional transformer-based controllers are, so it will help to integrate more renewable energy into the grid. MSU's power flow controller can be installed anywhere in the existing grid to optimize energy transmission and help reduce transmission congestion.



MSU's high voltage high power inverter technology

IMPACT

If successful, MSU would help to cost effectively integrate more renewable electricity into the existing grid—improving the grid's overall efficiency and reliability.

- SECURITY: A more efficient, reliable grid would be more resilient to potential disruptions from failure, natural disasters, or attack.
- ENVIRONMENT: Enabling increased use of wind and solar power would result in a substantial decrease in carbon dioxide (CO_2) emissions in the U.S.—40% of which are produced by electricity generation.
- ECONOMY: A more efficient and reliable grid would help protect U.S. businesses from costly power outages and brownouts that stop automated equipment, bring down factories, and crash computers.
- JOBS: Advances in grid hardware could result in new high-paying jobs in supporting sectors such as engineering, manufacturing and service.

CONTACTS

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